

# Technical Data

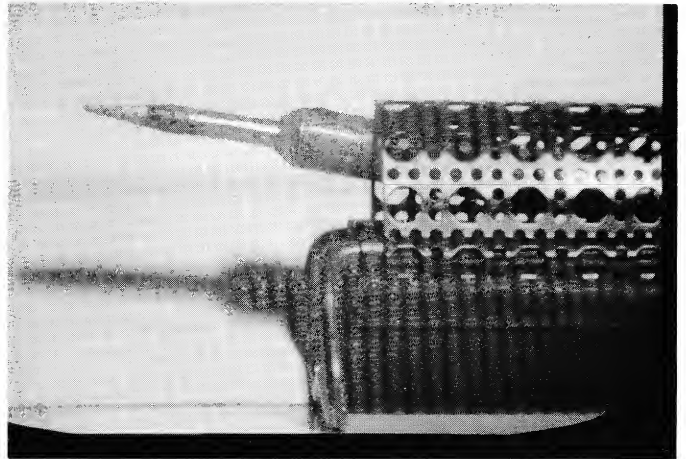
## INFRA-RED TELEVISION CAMERA, MODEL IR 1000.

### NEW INFRA-RED SENSITIVE TV SYSTEM

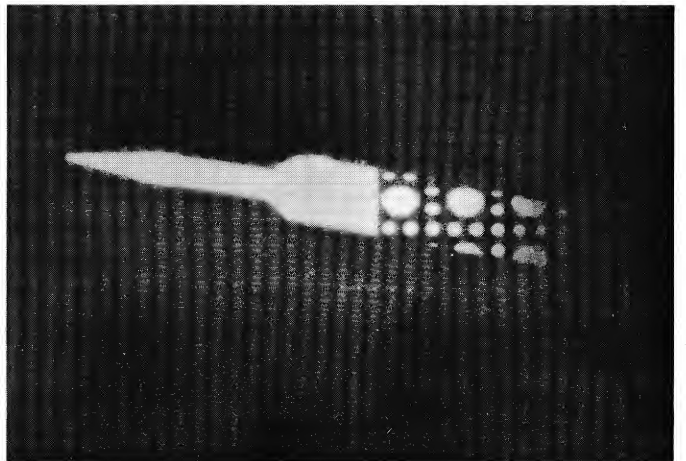
- \* 600 TV Lines vertical and horizontal resolution
- \* Separate field-mesh IR vidicon tube
- \* Plug-in circuit boards for easy maintenance
- \* Sensitivity to 2 microns

To "see" radiant energy down to 200°C Granger Associates has developed a new IR sensitive high-scan rate, closed-circuit television camera system. The G/A Model IR 1000 has a sensitivity down to two microns.

The entire system is solid state with silicon transistors, silicon micrologic elements and tantalum capacitors. The camera control unit handles one or two cameras and takes only 3-1/2 inches of vertical rack space. The camera controls can be cabinet mounted and the vidicon controls can be remoted by using an optional kit provided with the system. The picture can be sent by coaxial cable to remote locations at distances up to 1000 feet.



Hot soldering iron illuminated by visible light and viewed with normal vidicon.



Hot soldering iron in absence of visible light viewed with IR 1000 camera.

**Granger**  
**Associates**

Granger Associates, 1601 California Avenue, Palo Alto, California/Tel: 415-321-4175/TWX: 910-373-1291

## APPLICATIONS

Check laser patterns  
Find stress lines in plastics  
See hydrogen flames in sunlight  
Monitor airfoil heating in supersonic wind tunnels  
Detect crystal dislocations in germanium and silicon  
Study temperature distribution in engine exhausts  
Monitor critical security areas secretly with IR floodlights

## SPECIFICATIONS

Scanning system. 1029 lines, 30 frames per second, interlaced two to one.

AC power requirements. 120 volts  $\pm 10\%$ , 60 cycles, 80 watts (110 watts with two cameras)

Lens. Any C-mount television-format vidicon lens will fit camera. For maximum resolving power use a 35-mm format lens (with a special C-mount adapter) such as the Micro-Nikkor-Auto (available from Granger Associates)

Camera cable. Up to 300 feet... (type) Belden 8280

Inputs. For external drive:

|                   |               |           |               |
|-------------------|---------------|-----------|---------------|
| Horizontal drive: | $4 \pm 0.5$ v | Blanking: | $4 \pm 0.5$ v |
| Vertical drive:   | $4 \pm 0.5$ v | Sync:     | $4 \pm 0.5$ v |

Outputs. 75-ohm source terminated

#1. 1.0/0.7 v P-P non-composite or 1.4/1.0 v P-P composite

#2. Same as #1, isolated approximately 40 db

Limiting resolution. 600 lines center resolution, limited only by pickup tube and optics.

Bandwidth. 30 MHz (at normal vidicon output levels.

Signal-to-noise ratio. Peak signal-to-RMS-noise, 36 db for 30 MHz bandwidth at camera output

On-axis sweep linearity. 1%

Geometric distortion. 2% or less

Tilt on vertical interval. 2% or less

Controls. On slide-out panel of

Camera Control Unit.

Provision for remoting: Beam, Target, Focus, and set-up.

## ORDERING INFORMATION

For a complete single camera system, order Granger Associates No. 0915477 which includes:

Camera, IR 1000

IR 1000 Camera Control Unit, rack-mount

Camera Cable, 25 ft. (Type RG-59) with connectors attached

Vidicon Tube, type N-214 separate mesh

Lens (specify focal length and/or viewing area and distance)

Sync Generator/1029

Monitor Cable, 25 ft (Type RG-59) with type VHF connectors attached

Extender Card (for testing plug-in modules)

Shipping weight: 75 lbs.

More information for you.

Additional information on this product is available from the G/A communication engineering office nearest you or from Granger Associates, 1601 California Ave., Palo Alto, California 94304.

# TV convertible – 12 popular line rates.

**Closed-circuit system features  
quick change to choice of rates  
from 525 to 1225 lines.**

Why limit your research TV to a single line rate? Our V1000 system gives you wide "first choice" and lets you convert economically to other line rates when necessary. Ideal for microscopy, ultraviolet, infrared, image storage, X-ray, or any project requiring high precision and stability. Small, rugged, and reliable. In CCTV flexibility, G/A has the answer *now*. Request complete technical information.



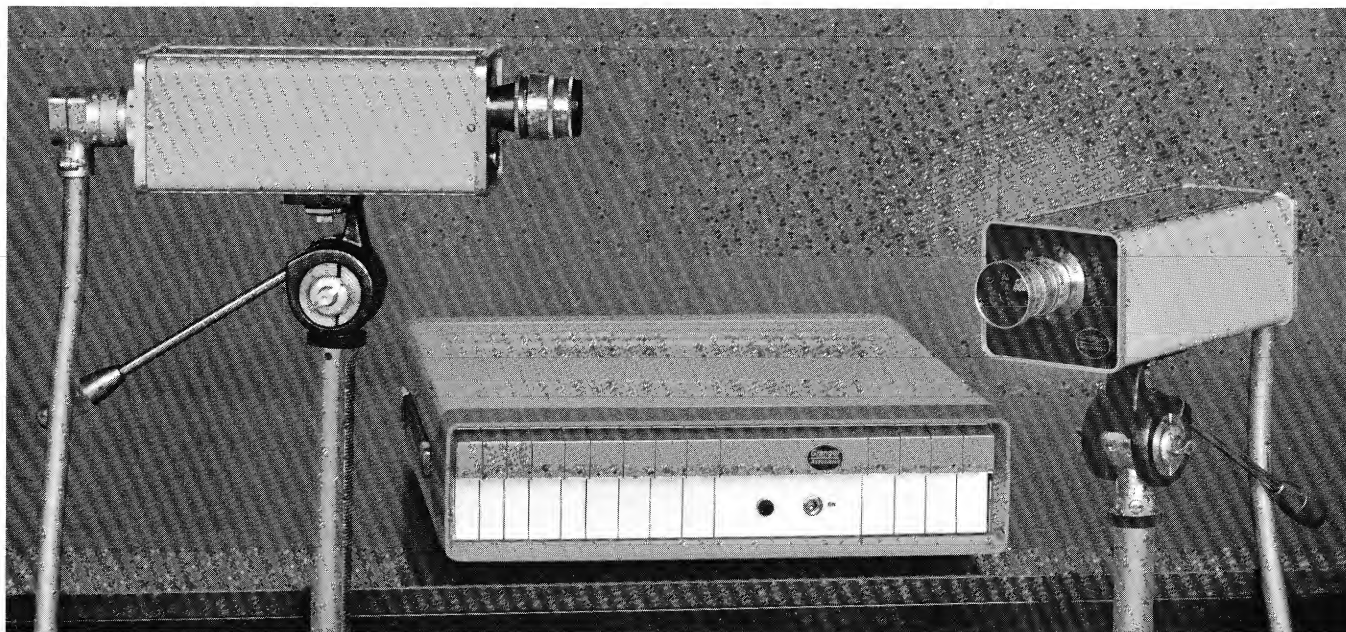
*Granger*  

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*Associates*

# High-Resolution 1029-Line Closed-Circuit TV System

## MODEL V1000



### NEW TV FLEXIBILITY-ONE CONTROL UNIT POWERS TWO 1029 LINE CAMERAS

- \* Read clearly an entire typewritten page
- \* Photos or real-time situation displays seen with remarkable clarity
- \* 30 MHz bandwidth for high horizontal resolution at high line rate
- \* 1000 TV lines horizontal resolution, 720 lines vertical resolution

The Granger Associates 1029-line system (Model V1000) is an extremely flexible, high quality, closed-circuit television instrument. Its resolving power makes it possible to perform functions that demand an instrument-quality system. The G/A V1000 is now being used in many highly specialized instrumentation and research systems.

The G/A 1029 line system gives the optimum combination of vertical and horizontal resolution. If, at any time a change is desired, plug-in circuit cards are available to convert the sync generator to any of twelve line rates from 525 to 1225 lines per frame. The compact, light-weight control unit includes a built-in sync generator.

### APPLICATIONS

Remote reading of gages and controls  
Remote quality control in atomic assembly  
Remote readout of printed or filmed information  
Education... such as dental and medical school information  
Signature verification  
Microscope projection in biological studies  
High-resolution simulators  
Comparison by split-image with an optical comparator

### CAMERA

The G/A 1029-line V1000 camera is a compact, rugged, fully transistorized unit requiring little or no maintenance. It is protected by a dust-proof enclosure... no ventilating ports are needed because the high-efficiency focus coil generates very little heat.

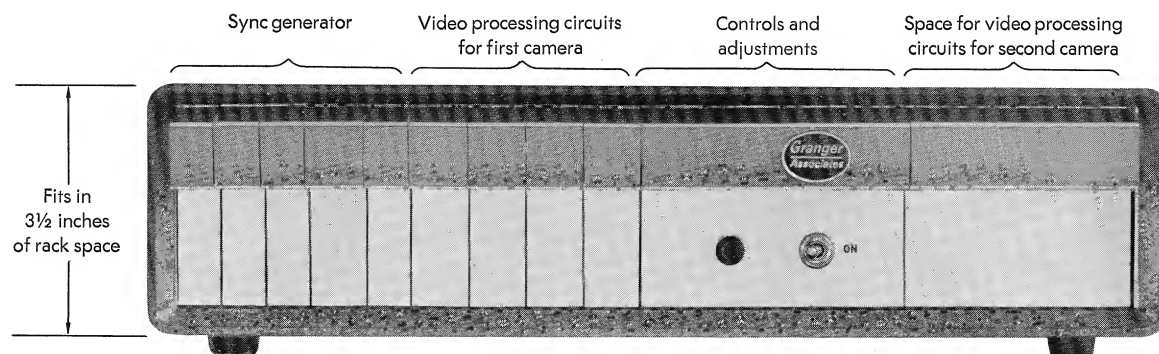
**Granger**  
Associates

## CAMERA CONTROL UNIT

The G/A 1029-line camera control unit powers one or two of the G/A V 1000 cameras, making this an economical, flexible, CCTV system. The second camera can be added at a later time to adapt the TV instrument to a new application. The control unit fits into just 3-1/2 inches of rack space or it can be mounted in its own desk console. The control unit provides three major functions:

- 1) it processes the video signal from the camera (or cameras),
- 2) it supplies synchronizing pulses for camera and monitor,
- 3) it supplies dc power for the total system.

Like the camera, the G/A 1029 control unit is all solid state, using the very latest in integrated circuitry.



The compact control cabinet will house all circuits and controls necessary to operate two camera. The chassis fits easily in a standard 19-inch rack.

## SYSTEM SPECIFICATIONS

Scanning system. 1029 lines, 30 frames per second, interlaced two to one.

AC power requirements. 120 volts  $\pm 10\%$ , 60 cycles, 80 watts (110 watts dual)

Lens. Any C-mount television-format vidicon lens will fit camera. For maximum resolving power use a 35 mm format lens with special C-mount adapter such as the Micro-Nikkor-Auto (available from Granger Associates)

Camera cable. Up to 300 feet... (type) Belden 8280 (farther with some resolution loss)

Inputs. For external drive:

|                   |              |           |              |
|-------------------|--------------|-----------|--------------|
| Horizontal drive: | $4 \pm 0.5v$ | Blanking: | $4 \pm 0.5v$ |
| Vertical drive:   | $4 \pm 0.5v$ | Sync:     | $4 \pm 0.5v$ |

Outputs. 75-ohm source terminated

- # 1. 1.0/0.7v P-P non-composite or 1.4/1.0v P-P composite
- # 2. Same as #1, isolated approximately 40 db.

Limiting horizontal resolution. 1000 lines center resolution

Vertical resolution. 720 TV lines

Bandwidth. 30 MHz (at normal vidicon output levels)

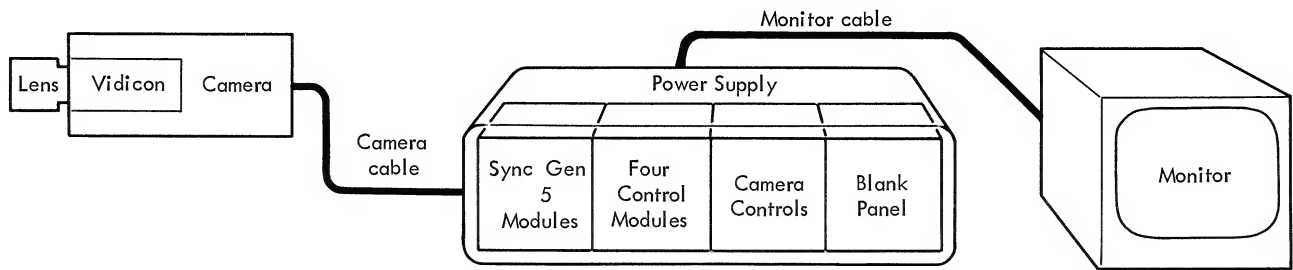
Signal-to-noise ratio. Peak signal-to-RMS-noise, 36 db for 30 MHz bandwidth at camera output

On-axis sweep linearity. 1%

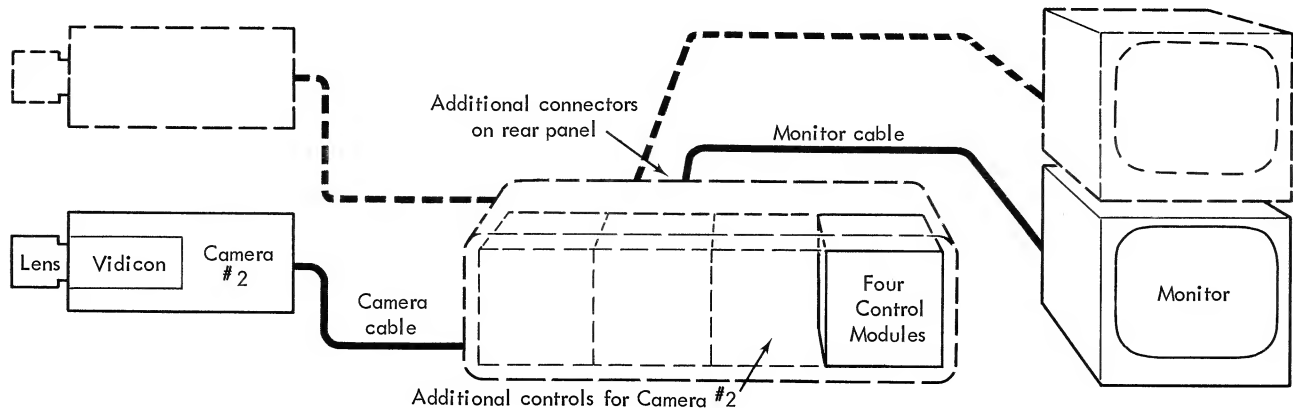
Geometric distortion. 2% or less

Tilt on vertical interval. 2% or less

Controls. On slide-out panel of Camera Control Unit. Provision for remoting: Beam, Target, Focus & Set-up.



A complete, independent system providing one camera and monitor.



Additions to the above system to provide a second camera and monitor.

### ORDERING INFORMATION

For a single-camera system, order Granger Associates No. 0915475-01\* which includes:

- 1 Camera, V1000 (1029 line)
- 1 V1000 Camera Control Unit (1029 line), rack mount
- 1 Camera cable, 25 ft. (type 8280) with connectors attached.
- 1 Vidicon tube, GEC type 8507, separate mesh
- 1 Sync Generator, (1029 line)
- 1 Monitor Cable, 25 ft. (type RG-59) with type UHF connectors attached
- 1 Card Extender (for testing plug-in modules)

Optional -- 17" Monitor, 1029 lines, high resolution.

\*NOTE: To include a monitor with the above items for a complete single camera system, use G/A No. 0915475-02.

For a dual-camera system, order Granger Associates No. 0915476-01\* which includes:

- 2 Cameras, V1000 (1029 line)
- 1 V1000 Camera Control Unit (1029 line), rack mount
- 2 Camera Cables, 25 ft. (type 8280) with connectors attached.
- 2 Vidicon tubes, GEC type 8507, separate mesh
- 1 Sync Generator, (1029 line)
- 2 Monitor Cables, 25 ft. (type RG-59) with type UHF connectors attached
- 1 Card Extender (for testing plug-in modules)

Optional -- 17" Monitors, 1029 lines, high-resolution.

\*NOTE: To include two monitors with the above items for a complete dual-camera system, use G/A No. 0915476-02.

### MORE INFORMATION FOR YOU

For more information on the Granger Associates television products, contact the G/A communication engineering office nearest you or Granger Associates, 1601 California Avenue, Palo Alto, California 94304; 818 18th Street N.W., Washington D.C. 20006; or 3025 Garland Terrace, Colorado Springs, Colorado 80910.

Data subject to change without notice. Printed in the U.S.A.



